REMARKS

Claims 33, 35, 40 - 42, 46 - 48, 52 - 54, 58 - 60 and 64 have been amended. Claims 1- 32 and 36 have been canceled. Such cancellation is without prejudice to further prosecution of these claims in one or more continuing applications. Claims 37 - 39, 43 - 45, 49 - 51, 55 - 57 and 61 - 63 remain unchanged. Claim 65 has been added. Claims 33, 34, and 35 - 65 remain in the application.

Independent claims 33, 41, 47, 53 and 59 have been amended to recite that the charge treatment is applied to the surface of the sheets formed from blended nonwoven fibers. Support for this amendment may be found in the specification at paragraphs 0019 and 0020 (referring to the paragraph number from the published patent application). Support may also be found in paragraphs 0039, referring to Examples 2 and 3.

Claims 35, 40, 42, 46, 48, 52, 54, 58, 60 and 64 have been amended in response to rejections under 35 USC 112, second paragraph.

New claim 65 has been added. Claim 65 is a combination of claims 33, 34 and now-canceled claim 36. Based on the Examiner's comments in the Office Action, it is believed that the combination of these claims results in allowable subject matter. Notification of the same is respectfully requested.

No new matter is added. Favorable reconsideration is respectfully requested.

The following comments address the issues presented in the Office Action dated December 19, 2005 in order of their appearance in the Office Action.

Response to Arguments

Referring to paragraphs 1 - 3, Applicants acknowledge the withdrawal of claims 1-32 in response to the restriction requirement, covered in paragraphs 1-3 of this Office Action.

Claims 1-32 have been canceled without prejudice to further prosecution of these claims in one or more continuing applications.

Specification

In paragraph 4, the Abstract has been objected to because of its length. In response, the Abstract has now been shortened to less than 150 words. It is now believed that any objections to the Abstract have been overcome.

Claim Rejections - 35 USC 112

In paragraph 5, claim 35 was rejected under 35 USC 112, second paragraph, as being indefinite for the phrase "or other low melting temperature fibers." By the amendment to claim 35, which removed this phrase, it is now believed that this rejection has been overcome.

In paragraph 6, claims 36, 42, 48, 54 and 60 were rejected as being indefinite with respect to the phrase "wherein fibers of 10-90% of polypropylene, including bi-component fibers, are used in the blend." In response, claim 36 was canceled (in favor of new claim 65 which includes the amended recitation) and claims 42, 48, 54 and 60 were amended to recite:

> fibers of 10-90% microdenier or fine fibers selected from the group consisting of polypropylene, polyester, bi-component fibers or blends are combined with fibers of 90-10% fine or coarse fiber selected from the group consisting of polypropylene, polyester, bi-component fibers or blends.

Support for this amendment can be found in paragraph 0016 of the published patent application. Applicants submit that this amendment should clarify the limitation in the claims and overcome the rejection.

In paragraph 7, claims 41, 47, 53 and 54 were rejected because of the phrase "micro-denier/fine-denier blend fibers." For examination purposes, the Examiner applied the definition of "microfiber" as provided by the *Dictionary of Fiber & Textile Technology* to require fibers of less than 1.0 denier per filament. The Examiner is correct in the definition of "microdenier." Support can be found in the aforementioned dictionary and in Attachment A. Attachment A defines microfiber, also referred to as "micro-denier fiber," as a "fiber of

less than one denier." Fine denier is defined as fibers of between 1 and 5 denier per filament. Coarse denier is defined as fibers with more than 5 denier per filament. Applicants submit that these definitions are known to the industry. In view of this, applicants believe that the rejection to these claims has now been overcome.

In paragraph 8, claims 47, 53 and 59 were rejected because they recite "coarse-denier fibers. As stated in the prior paragraph, the term "coarse denier" is known to the industry and typically refers to fiber with more than 5 denier per filament. As an example, Attachment B refers to a "coarse denier" fiber having 15 to 30 denier per filament. It is believed that this should be sufficient to render these claims definite.

In paragraph 9, claims 40, 46, 52, 58 and 64 were rejected due to the phrase "and the like." These claims have been amended to remove this phrase. In view of this amendment, applicants believe that this rejection has been overcome.

The Present Invention

Before responding to the prior art rejections, a brief review of the present invention and its advantages are in order. The present invention is directed to a resin-charged synthetic nonwoven filtration media. In contrast to the prior art, the media of the present invention includes at least one sheet of a blend of nonwoven fibers with a resin-charged treatment applied to the surface of each sheet. The combination of materials in the media of the present invention leads to a multi-component, charged synthetic nonwoven filtration media having enhanced performance in efficiency and life. The filtration media of the present invention has many advantages over conventional filter materials.

First, the resin charged media of the present invention can be a single or layered construction needled together to provide a graded-density structure of fine fibers intermixed with finer fibers. This resulting media possesses a higher particulate loading retention capability, particularly early in the filtration cycle, relative to other cellulose, spun-bonds, or other similar materials commonly applied to filtration applications where filtration is

predominantly a surface-loading phenomenon. With the filter media consisting of a graded structure, surface loading phenomenon can be reduced and filter life improved.

Second, the resin-charged media of the present invention possesses a higher particulate loading retention capability, particularly early in the filtration cycle, relative to other cellulose, spun-bonds, or other similar materials commonly applied to filtration applications where filtration is predominantly a surface-loading phenomenon.

Third, since the layers in the media of the present invention are physically combined using needling technology, the layers will not separate. This would otherwise result in efficiency losses due to channeling or gapping.

Fourth, being constructed of synthetic, melt-bondable fibers, the charged filter media of the present invention can be formed into various shapes, sizes, and configurations through conventional and other thermal-forming techniques such as hot air, seal bar, ultrasonic, or vibration welding. The charged filter media of the present invention can be formed into flat or curved filter sheets, pleated filters, filter cartridges, filter bags, filter tubes, and the like.

Fifth, the filtration media includes a charged multiple component, synthetic nonwoven media that has superior performance capabilities over conventional filter materials. The resin applied sheets produced by the method of the present invention possess adequate charge to improve the overall removal and retention of effluent particles.

Claim Rejections - 35 USC 102

In paragraph 10, claims 33, 35-37 and 39-40 are rejected under 35 USC 102(b) over U.S. Patent 5,726,107 to *Dahringer et al.* The Examiner alleges that *Dahringer et al.* teach a nonwoven of electret fiber mixtures that comprise at least two types of fibers and charge control agents (abstract). The Examiner further alleges that the nonwoven may be formed via needle-punching. The fibers of the nonwoven may be polypropylene. The nonwoven mainly comprises fibers with 0.01 to 30% by weight of the invention being charge control agents (abstract). This teaching provides for the applied article to comprise 70-99.99 weight % polypropylene fibers. A number of charge control agents (charge treatment agents) may be

applied to the fibers of the nonwoven fabrics including cationic amides. In view of the amendments to the claims, this rejection is respectfully traversed.

Independent claim 33 has been amended to recite a charged nonwoven filtration media which comprises one of more sheets formed from blended nonwoven fibers, and a charge treatment applied to the surface of said sheets. *Dahringer et al.* neither discloses nor recites the filtration media in which the charge treatment is applied to the surface of the sheets. The *Dahringer et al.* filters are charged "electrostatically in a controlled manner, . . . , in a corona discharge [column 8, lines 65 - 67]. *Dahringer et al.* list a number of charge control agents [column 12, lines 50 - 59]; however, all of the agents are installed in an electrostatic manner. Referring to the paragraph bridging columns 12 and 13 of *Dahringer et al.*, the charge control agents are contained in the fiber material "chiefly in dispersed form" or "finely dispersed in the continuous phase of the fiber-forming polymer or polycondensate." In contrast, the present invention recites a filtration media in which the charge treatment is applied to the surface of the sheets of fibers. Support is found in the specification at paragraphs 0019 and 0020 and 0039, which refers to Examples 2 and 3. Advantageously, the present claimed invention "clearly shows that the resin applied sheets produced by the method of the present invention possess adequate charge to improve the removal and retention of effluent particles" [paragraph 0039]. Therefore, applicants submit that the rejection to claim 33 has been overcome and should be removed. Because 35, 37, 39 and 40 depend from claim 33, applicants submit that these claims should also be in condition for allowance. Notification of the same is solicited.

Claim Rejections - 35 U.S.C. § 103

In Paragraph 11, Claims 34, 41-43, 45-49, 51-55, 57-61 and 63-64 are rejected under 35 U.S.C. § 103(a) over the '107 patent to *Dahringer et al.* in view of U.S. Patent 5,364,456 to *Kahlbaugh et al*.

Dahringer et al. is described above. The Examiner alleges that *Kahlbaugh et al*. teach a filtration article that comprises a gradient depth filter system with multiple layers (column 5, lines 42-46) that decrease in fiber size with depth (column 5, lines 7-10). The Examiner

further alleges that *Dahringer et al.* and *Kahlbaugh et al*. are from the same field of endeavor, i.e., filters. Because of this, the Examiner alleges that the purpose disclosed by *Kahlbaugh et al*. would have been recognized in the pertinent art of *Dahringer et al.* Therefore, the Examiner states that it would have been obvious to have made the article of *Dahringer et al.* into a multi-layer density graded fiber. The skilled artisan would have been motivated by the desire to create a filter with an extended lifetime or relative long lifetime (column 6, lines 44-49).

In view of the amendments to the claims and applicants remarks, this rejection is respectfully traversed. First, the presently claimed invention recites a charge surface applied to the surface of the sheets. Neither *Dahringer et al.* nor *Kahlbaugh et al.* , alone or in combination, describe or even suggest this limitation. In view of this applicants submit that the claims recite over the combination of prior art.

In addition, applicants disagree with the Examiner's rationale for combining the two references. *Dahringer et al.* is directed to non-woven fibers for use for the production of dust filters and dust cloths with fibers of electrically non-conductive materials which are capable of storing charges [col. 1, lines 14 –18]. *Kahlbaugh et al.* is directed to a filter for collecting particulate material from gaseous streams. Both the design and purpose of the *Kahlbaugh et al.* filter is very different from that disclosed in *Dahringer et al.* Applicants submit that the rejections should be withdrawn because they do not explain where the prior art suggests any benefit to incorporating the gradient depth filter system with multiple layers of *Kahlbaugh et al.* with the media of *Dahringer et al.* Without such an explanation, the rejections are improper. The case of *In re Rouffet* , 47 USPQ2d 1453 (Fed. Cir. 1998) is illustrative of the principle that in order to make out a proper *prima facie* case of obviousness, the Office must identify a specific motivation to both *select* and *combine* the teachings of the prior art to obtain the claimed invention. In reviewing the rejections in issue, the Court initially stated that:

When a rejection depends on a combination of prior art references, there must

> be some teaching, suggestion, or motivation to combine the references. See *In re Geiger*, 815 F.2d 686, 688, 2 USPQ2d 1276, 1278 (Fed. Cir. 1987). . . . Therefore, "[w]hen determining the patentability of a claimed invention which combines two known elements, "the question is whether there is something in the prior art as a whole to suggest the desirability, and thus the obviousness, of making the combination.'" See *In re Beattie* , 974 F.2d 1309, 1311-12, 24 USPQ2d 1040, 1042 (Fed. Cir. 1992) (quoting *Lindemann Maschinenfabrik GmbH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984)).

Id. at 1456. The Court then reversed the rejections of the claims, stating that the Examiner and Board failed to identify any true motivation in the prior art for combining the prior art elements to obtain the claimed invention:

> As this court has stated, "virtually all [inventions] are combinations of old elements." *Environmental Designs, Ltd. v. Union Oil Co.* , 713 F.2d 693, 698, 218 USPQ 865, 870 (Fed. Cir. 1983); see also *Richdel, Inc. v. Sunspool Corp.*, 714 F.2d 1573, 1579-80, 219 USPQ 8, 12 (Fed. Cir. 1983) ("Most, if not all, inventions are combinations and mostly of old elements."). Therefore an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue. Furthermore, rejecting patents solely by finding prior art corollaries for the claimed elements would permit an examiner to use the claimed invention itself as a blueprint for piecing together elements in the prior art to defeat the patentability of the claimed invention. Such an approach would be "an illogical and inappropriate process by which to determine patentability." *Sensonics, Inc. v. Aerosonic Corp.* , 81 F.3d 1566, 1570, 38 USPQ2d 1551, 1554 (Fed. Cir. 1996).
>
> To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to **[1458]** show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.

Rouffet, 47 USPQ2d at 1457-1458. [1] The Court went on to state that

> As this court has often noted, invention itself is the process of combining prior art in a nonobvious manner. See, e.g., *Richdel*, 714 F.2d at 1579; *Environmental Designs* , 713 F.2d at 698. Therefore, even when the level of skill in the art is high, the Board must identify specifically the principle, known to one of ordinary skill, that suggests the claimed combination. Cf. *Gechter v. Davidson* , 116 F.3d 1454, 43 USPQ2d 1030 (Fed. Cir. 1997) (explaining that the Board's opinion must describe the basis for its decision). In other words, the Board must explain the reasons one of ordinary skill in the art would have been motivated to select the references and to combine them to render the claimed invention obvious.

Rouffet, 47 USPQ2d at 1459. The requirement that the USPTO clearly set forth the reasoning whereby the references would lead one to the claimed invention was also emphasized in the case of *Winner International Royalty Corp. v. Wang* , 53 USPQ2d 1580, 1586 (Fed. Cir. 2000) (citations and footnotes omitted):

> When an obviousness determination is based on multiple prior art references, there must be a showing of some "teaching, suggestion, or reason" to combine the references. .... Although a reference need not expressly teach that the disclosure contained therein should be combined with another, the **[1587]** showing of combinability, in whatever form, must nevertheless be 'clear and particular.'"

See also MPEP 2142. Here, no such "clear and particular" showing is provided – it is only stated that one of ordinary skill would make the modification because it is "well known in the art." However, this does not truly explain why one of ordinary skill would be motivated to make the proposed modification – what benefit would arise? Again, *Kahlbaugh et al.* is intended to serve as a filtration system for gaseous streams; it makes no sense to have a such a system applied to that disclosed in *Dahringer et al.*

It is requested that the Examiner step back, place the applicant's invention out of mind, and objectively ask what the *Kahlbaugh et al.* and *Dahringer et al.* references would lead one of ordinary skill to create. It is not seen how the claimed invention would result.

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[1] See, e.g., MPEP 2142: "The initial burden is on the examiner to provide some suggestion of the desirability of doing what the inventor has done."

In paragraph 12, claims 38 and 44 are rejected under 35 U.S.C. 103(a) over *Dahringer et al.* as applied to claims 37 and 43, and further in view of U.S. Publication 2002/0168912 to *Bond et al.* The Examiner alleges that *Bond et al.* teach needle-punched (paragraph 0136) nonwoven webs comprising polypropylene fibers (paragraph 0137) that may be used as filters (paragraph 0138). The fibers may comprise multiple components and may include wet strength resins such as polyamide-epicholorohydrin (PAE) (paragraph 0062). The Examiner alleges that *Dahringer et al.* and *Bond et al.* are from the same field of endeavor, i.e., filters. Therefore, the Examiner alleges that the purpose disclosed by *Bond et al.* would have been recognized in the pertinent art of *Dahringer et al.* As a result, the Examiner states that it would have been obvious to have made the article of *Dahringer et al.* with the wet strength resin of *Bond et al.* with the motivation to improve cross-linking ability of the polypropylene fibers of the filter (paragraph 0062). The Examiner further alleges that the invention of *Bond et al.* provides for a different motivation than applicant for the inclusion of PAE into the nonwoven filter fabric, but the teaching still reads on the instantly claimed article as it would also serve as charge treatment to the polypropylene fibers.

For reasons expressed above, applicants submit that independent claims 33 and 41 are in allowable condition. Therefore, it is submitted that claims 38 and 44, both of which depend indirectly from these independent claims, are in allowable condition.

In Paragraph 13, claims 50, 56 and 62 are rejected under 35 U.S.C. 103(a) over *Dahringer et al.* in view of *Kahlbaugh et al*. as applied to claims 49, 55 and 61, and further in view of *Bond et al.* The Examiner admits that the inventions of *Dahringer et al.* and *Kahlbaugh et al*. are silent as to the use of polyamide-epicholorohydrin (PAE). The Examiner further alleges that *Bond et al.* teach needle-punched nonwoven webs comprising polypropylene fibers that may be used as filters. The fibers may comprise multiple components and may include wet strength resins such as PAE. Since, as the Examiner alleges, *Kahlbaugh et al*. and *Bond et al.* are from the same field of endeavor, i.e., filters, the purpose disclosed by *Bond et al.* would have been recognized in the pertinent art of *Dahringer et al.* Thus, the Examiner alleges that it would have been obvious to have made the article of

Dahringer et al. with the wet strength resin of *Bond et al.* with the motivation to improve cross-linking ability of the polypropylene fibers of the filter (paragraph 0062). *Bond et al.* provides for a different motivation than applicant for the inclusion of PAE into the nonwoven filter fabric. However, the Examiner alleges that the teaching still reads on the instantly claimed article as it would also serve as charge treatment to the polypropylene fibers.

For reasons expressed above, applicants submit that independent claims 47, 54 and 60 are in allowable condition. Therefore, claims 50, 56 and 62, which depend indirectly from these independent claims, should also be in allowable condition.

New Claim

New claim 65 has been added. Claim 65 is a combination of claims 33, 34 and now-canceled 36. In view of the Examiner's comments in the Office Action, it is believed that claim 65 is allowable over the prior art. Notification of the same is requested.

Should the Examiner have any questions or comments with respect to the application, the Examiner is requested to contact the undersigned attorney. The attorney welcomes and encourages telephone calls related to this application because this may allow the resolution of disputed claim language and/or other informalities more rapidly and efficiently than by any other means. The Commissioner is authorized to charge any fees or credit any overpayments relating to this application to deposit account number 18-2055.

OIPE IAP89
MAY 22 2006
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Respectfully submitted,

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Attachments:

Attachment A: Website Print Out entitled: "Modern Uniforms - Outerwear Glossary," June 1, 2004 (http://www.modernuniformsmag.com/mag/outerwear_glossary/index.html)

Attachment B: Website Print Out entitled: "Ten POW Chemical Industry Co., Ltd. - Needle Punching Non-Woven (http://www.allproducts.com/textile/tenpow/04.html)

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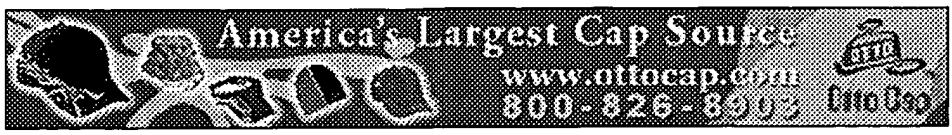
ATTACHMENT A



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PART 1 - SHELL FABRICS

BONDED FABRIC - A term used to describe two fabrics, which have been permanently adhered together. The fabrics can be adhered together either by a heated adhesive or a heated foam. A bonded fabric actually consists of three components, the face fabric, the adhesive, and the backing fabric. Virtually any fabrics can be bonded together - keeping in mind that when fabrics with different shrink rates are laundered, they will pucker.

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COTTON - A natural plant fiber that comes from the seed of a cotton plant. Grades of cotton vary mostly due to staple length, the length of the fiber. Staple length can range from 1/2" - 2 1/2" with the longer fibers being the better qualities. Sea Island, Pima, and Egyptian cotton are the highest quality, long staple cottons where Upland cotton, which is most widely used, is very low quality. Fabrics made from cotton absorb moisture and then dry quickly, producing a cooling effect. This makes the fabric good for hot weather. Cotton is washable and dry-cleanable, has no static or pilling problems, has a soft hand, and is inexpensive.

DOUBLE-KNIT - Specialty knit fabric created on rib or interlock machine. These fabrics have double-thickness and same look on both sides. Reversible garments can be created because the fabric has two faces. The double-thickness of fabric lends itself to being extra durable, holding shape well, and being wrinkle resistant. A double-knit fabric is the utmost comfortable fabric for the active/athletic person. You can bend and stretch and the garments will be breathable, non-restrictive and move with your body.

DUCK - A medium to heavyweight, plain-weave cotton-type fabric. Duck fabrics are one of the most durable fabrics, being lighter than canvas but heavier than sailcloth. They are very closely woven, heavy materials. Traditionally, duck fabrics are used in garments made for industrial purposes.

FAILLE - A medium weight, semi-lustrous fabric with very noticeable cross-wise ribs, also referred to as flat-ribbed. Faille fabrics are typically made from synthetic fibers like nylon or polyester.

MICROFIBER - also called micro-denier fiber, is a term used to define a man-made fiber of less than one denier. The fibers are finer than any natural fiber, being about half the thickness of silk. Microfiber fabrics are a result of new fiber technology, which ensures that a fabric is extremely soft and has a beautiful drape. They are considered ultra-soft luxury fabrics. Because of the advanced technology used in creating microfiber fabrics, the weaving and dying process are much more expensive, hence the term luxury fabric.

MICROFLEECE - A synthetic knit fabric with pile on one or both sides and has many of the same features as polar fleece (see polar fleece definition). The difference from a traditional polar fleece is that a microfleece is comprised of micro-filament fibers which are finer even than silk. Thus, a microfleece fabric will result in a finer fabric, that is lightest in weight, and with the most superior softness.

MICROSUEDE - is a term for fabric made from microfiber filament yarns that undergo a sueding finishing process. Microsuede starts with microdenier yarns (see definition under microfiber), which are used to produce microfiber fabrics. Then the surface of

the microfiber fabric goes through a sueding finishing process. Sueding a fabric is a process of running the fabric through cylinders with a sandpaper-like surface, creating a napped surface with an extremely soft feel. Even though comprised of synthetic fibers, microsuede has the touch and weight of genuine suede.

NYLON - A synthetic polyamide fiber having virtually the same properties as polyester. Nylon is a lightweight fiber with excellent strength and abrasion resistance, which means that the fabric will be extremely durable and hold up for a long time. Benefits of nylon include good elasticity, resilience, and drape. The fibers are non-allergenic and resistant to bacterial growth and therefore are used for surgical stitches. Some of the downfalls of the fibers are that they are non-absorbent, have static and pilling problems, poor resistance to sunlight, thus limiting the fiber for some uses. Nylon is another easy care fabric that allows for being washed or dry-cleaned.

POLAR FLEECE - A synthetic knit fabric with a pile on one or both sides typically made from either filament or spun polyester fibers. The fabric is knitted with tiny loops on one or both sides. The looped fabric then goes through a napping process, which cuts the loops into strands. The fabric is then sent through a combing process where the strands are groomed to stand upright. Next, the fabric goes through a shearing process where the strands are cut uniformly to create the pile. The last treatment using heat to assure the fabric is anti-pilling. This is to protect the fabric from pilling or allowing tiny balls of fabric to form on the surface. There are many grades of fleece available in the market. Fleece can vary in softness, thickness, density, weight, pile height, and look.

POLYESTER - A synthetic polymer fiber with a multitude of uses. Polyester fiber is medium-weight, of good strength and abrasion resistance, which means that the fabrics will be durable and last a long time. Although polyester is so versatile and widely used, it does have some unfavorable qualities. Polyester is unable to absorb water (so less comfortable against skin), hard to remove stains, and attracts oil. The upside is that the textile industry has plenty of finishes and treatments for the fibers to solve these problems. The fabric can be washed or dry-cleaned. It has excellent resiliency to washing and therefore is considered the best wash and wear fiber. In addition, polyester is non-absorbent and thus, it is quick drying.

RIP STOP - A term to describe fabrics that are woven with a double-thread at regular intervals so that small tears will not spread. Typically, a rip-stop fabric can be identified by a textured grid pattern on the surface of the fabric. Rip-stop patterns can be woven into an array of fabric types including: taffeta, Tactel, Taslan, canvas, poplin, microfiber, silk, and many more.

TACTEL - A registered fiber name describing a group of fibers that have unique tactile and aesthetic qualities. The filaments of the fibers undergo various texturising processes to distort the shape of the filament and create texture. The fabrics they create are best known for their softness, lightness, strength, easy care, and versatility. The fabrics also have excellent shape retention, resistance to pilling, and quick drying characteristics.

TAFETTA - A medium weight, plain weave, lustrous fabric, made from filament fibers. Taffeta fabric has good strength and abrasion resistance, and makes a rustle noise when rubbed together. This fabric takes color well, and can be washed or dry-cleaned. Typically comprised of polyester or nylon filaments when used for outerwear. Can be coated on the backside to be water resistant.

TASLAN - A registered fiber name for a brand of textured yarn that is made in a bulking process. Bulking a yarn is done setting a shape in the yarn with either heat or with a high velocity air stream. Yarns that are textured or bulked create fabrics that are heavier weight, more durable, provide more insulation, have a softer and drier feel, and more wrinke resistant.

TWILL - A medium to heavy weight fabric with a woven twill pattern, creating noticeable diagonal lines on the surface, much like the twill pattern in your jeans. Twill fabrics are more compact, stronger, and heavier which make them more durable fabrics than plain or basket weaves.

WATERPROOF FABRIC - Made up of either non-porous polyurethane or PVC fabric, or a woven fabric bonded to a non-porous laminate. Additionally, the seams of the garment must be either heat-sealed for polyurethane/PVC fabric, or taped for the bonded woven fabric, to ensure that there will be no water-leakage. A waterproof garment can be good and bad. The great thing is that your clothing will not become soaked with water during heavy rainfall, but down-side is that you may become overheated during heavy activity because excess body heat will not penetrate through the fabric.

WATERPROOF/BREATHABLE FABRIC - A wonderfully innovative fabric! This fabric has extraordinary climate control and comfort zone features. Commonly made from a woven fabric bonded to a waterproof and breathable membrane. This microporous membrane has microscopic holes that will not let liquid penetrate, but will allow for air and moisture vapors to pass through. This is the best type of fabric for the active person facing unpredictable weather patterns

WOOL - A natural fiber produced from the covering of sheep. Roughly 200 different types of wool are available. Wool has good

insulating properties because it absorbs moisture slowly and dries slowly - therefore producing no cooling effect. Also, the fibers retain warmth because they have a natural crimp, which provides air pockets as an insulation barrier. Another benefit of wool is that it is flame resistant. Wool is difficult to catch fire, burns slowly, and is self-extinguishing. Typically wool garments must be dry-cleaned so that the fabric won't felt and shrink.

WOOL BLEND - Wool fibers combined with various amounts of natural or synthetic fibers in order to make the fabric less expensive, easier-care, stronger, finer, or better drape. Melton wool is a type of wool blend.

PART 2 - LINING FABRICS

FLANNEL - A flannel is created by taking a cotton or rayon fabric and gently napping one or both sides. The napping is done by passing the woven fabric through a machine with rollers that are covered with wire bristled brushes. The fibers are literally raised from the surface of the fabric. This process creates insulating air cells that provide more warmth than plain cotton or rayon fabrics.

JERSEY - A plain knit fabric without a distinct rib in the texture, also known as a single-knit. Jersey fabrics were originally made from wool on the island of Jersey. Today, jersey knits are used to make fabrics from hosiery to sweaters. Multitudes of fibers can be combined to create many types of fabrics with different properties. Jersey fabrics are also used for T-shirts, bedding sheets, sportswear garment linings, and even knit terry and velour fabrics.

MESH - Mesh is a knit or woven fabric construction that has an open texture. A mesh fabric would be used when needing maximum breathability in a garment or when the lightest weight lining is required. Mesh garment linings are perfect for situations where your activities force your body temperature to change from cool to hot in a matter of minutes. Additionally, we have found that mesh is the number one athletic pant lining of choice in today's market.

QUILTED LINING - Quilted lining fabrics are created by top-stitching two layers of fabric together. This is typically done with a face fabric of taffeta, jersey, cotton twill, fleece, or other; and than choosing an insulation material like polyfill, needle-punch, Thinsulate, or the like. The face fabric and insulation material are then topstitched together in a specified pattern. Most common patterns are diagonals, boxes, or vertical and horizontal stripes. All patterns can be done at various width settings although most manufacturers are set up to do standard widths.

SATIN - Satin fabrics are created by choosing the finest quality filaments and closely weaving them together, but allowing for long floats. This creates a fabric that is highly lustrous, has a smooth face, an extremely lustrous texture, and an excellent drape. As a lining, satin fabrics are specifically combined with luxurious, expensive shell fabrics, like leather, fur, microsuede, and wool.

SWEATSHIRT FLEECE - Cotton or cotton blend knit fabrics that have smooth face and brushed back. The weight of the fabric and amount of cotton used can vary. Typically cotton content will be at least 50% of the total fiber content. The more cotton used will result in a softer and higher quality end product. The benefit of adding a synthetic fiber like polyester, will be to ensure the garment will have less shrinkage and be faster drying. By brushing the backside of the fabric, you add bulk and warmth to the fabric. Newer variations of the topside have been introduced creating texture and patterns into the face.

TRICOT - Warp-knit fabrics made on tricot knitting machines. Tricot fabrics will vary in use anywhere from lingerie to outerwear and upholstery. Three basic types are tricot jersey, satin tricot, and brushed tricot. Tricot fabrics are knitted with extremely high speed, being faster than woven and other knitted fabrics. Unfortunately, the speed of production does not mean lower overall costs. This is because high quality, uniform filament fibers are required in order to cope with the speed of the machines. You will commonly see brushed tricot in the outerwear as a garment or pocket lining.

Find this article at:
http://www.modernuniformsmag.com/mag/outerwear_glossary/index.html

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ATTACHMENT B

BEST AVAILABLE COPY

TEN POW Chemical Industry Co., Ltd.

Product

Product ID: 04

Needle Punching Non-Woven

Click here for details.

Specifications:

- Item
  - Coarse Denier: 15 ~ 70 Denier
  - Fine Denier: 1.5, 2, 3 Denier
- Cut Length
  - Coarse Denier / 38mm, 51mm, 64mm
  - Fine Denier / 38mm, 51mm
- Luster: Semi-Dull, Bright

Ordering information:

- Minimum Order:Negotiable
- TEL: 886-37-877566 / 877567
- FAX: 886-37-877568
- Email: tenpow@seed.net.tw, tenpow@giga.net.tw

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